



Climate Change, ET, and Water Use Information needs for Decision Making

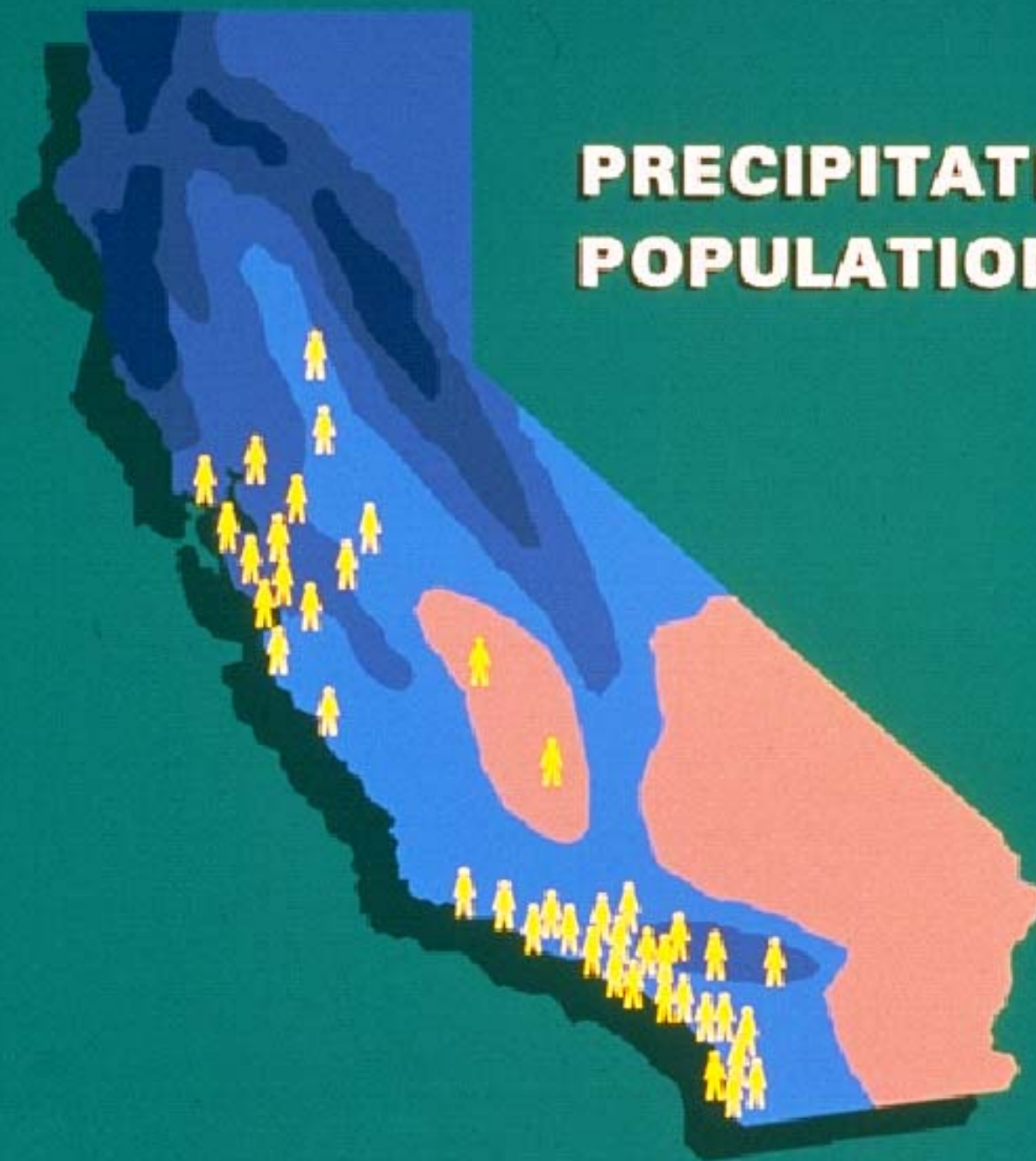
DWR/UC Workshop
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PRECIPITATION AND POPULATION



From DWR Bulletin 160

Sacramento San Joaquin Delta



Water Resources Models



CALSIM II CVP/SWP operations
reservoir operations, Delta exports,
carryover storage, etc



DSM2 Delta hydrodynamics and
water quality
flow, water levels, salinity, etc



IGSM2 Groundwater-surface
water
groundwater flow, surface water flow,
and surface-groundwater interaction

CALSIM II Grid

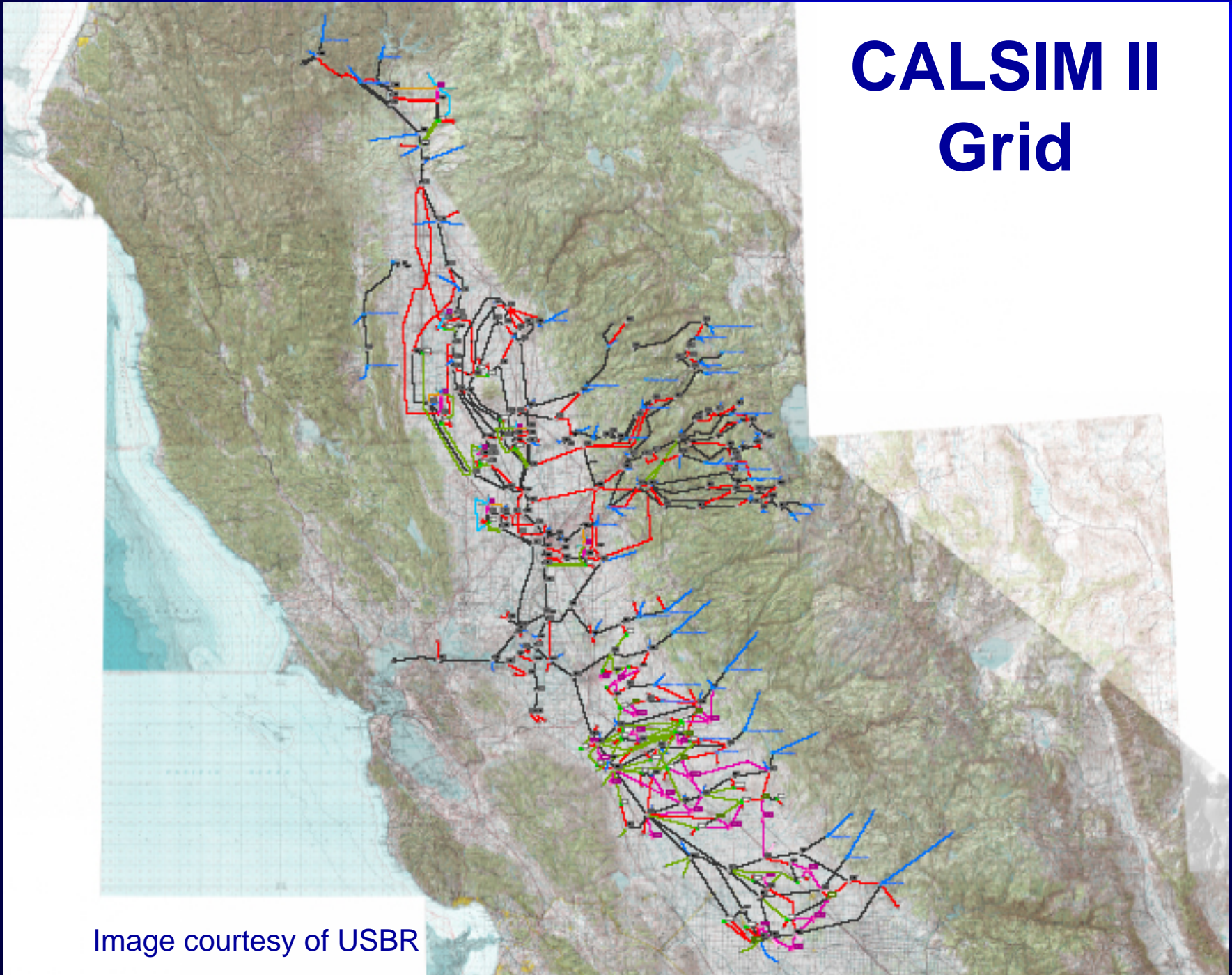


Image courtesy of USBR

DSM2 Grid

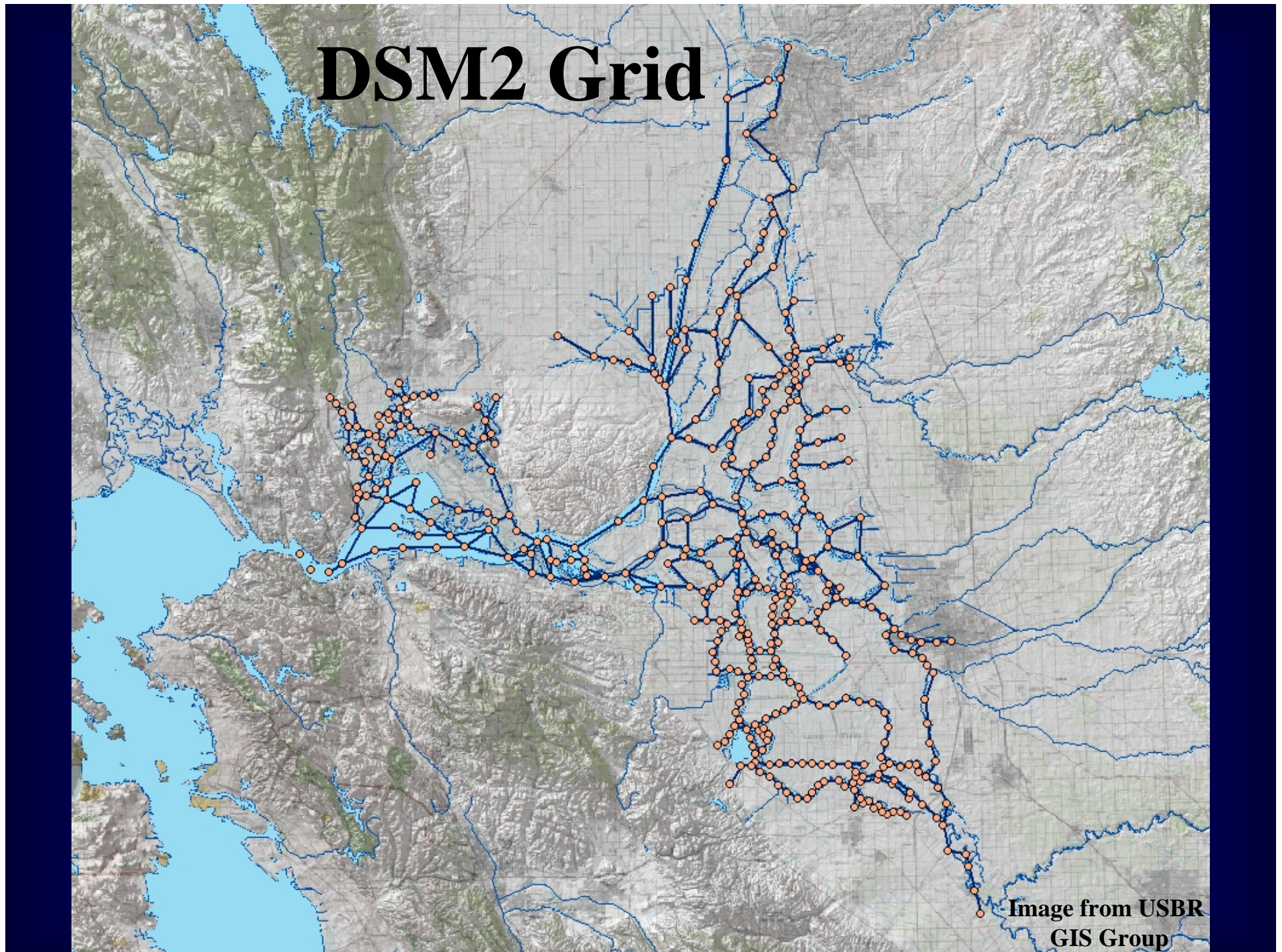
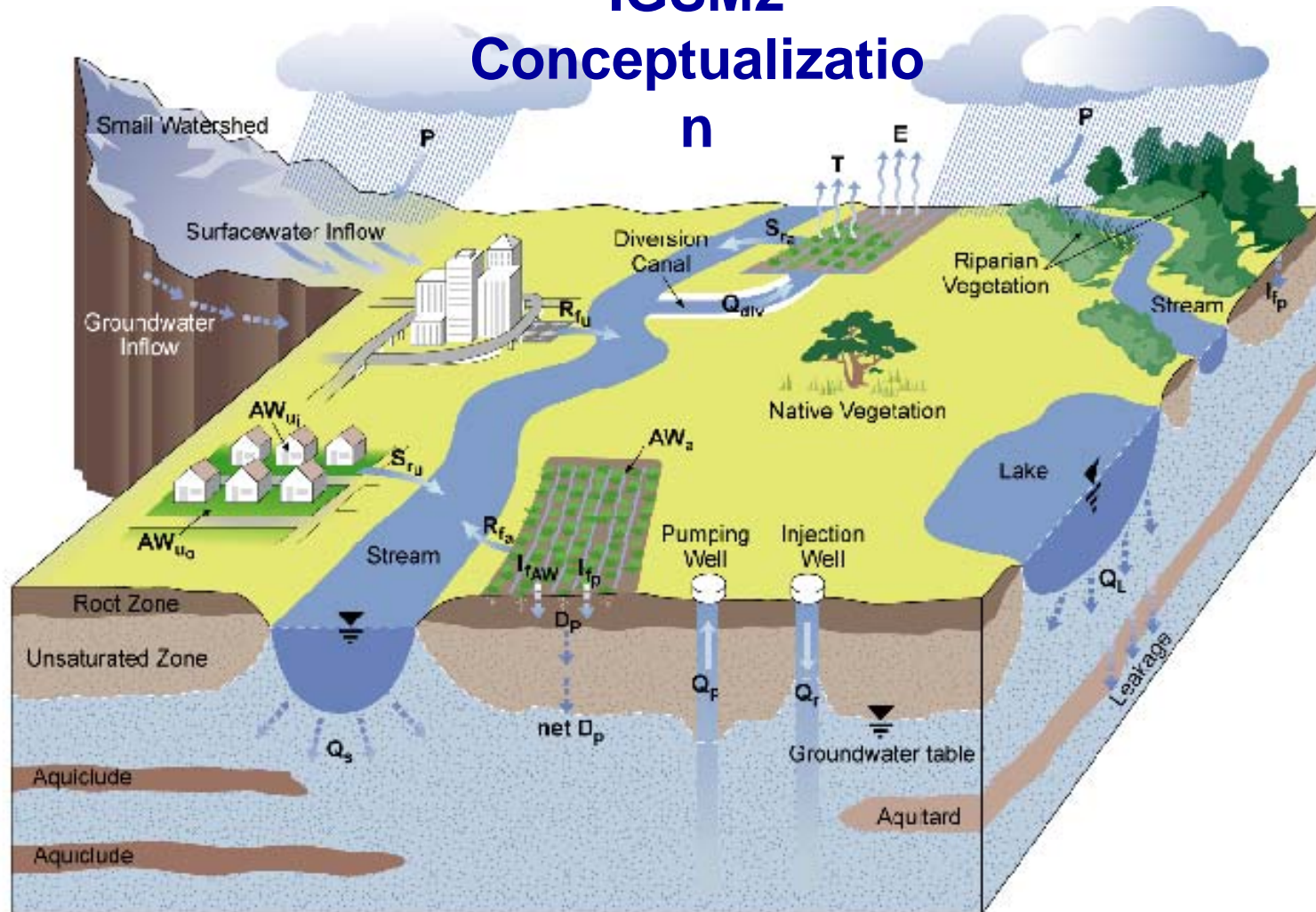


Image from USBR
GIS Group

IGSM2 Conceptualization



LEGEND

P Precipitation

AW_a Water applied to agricultural lands

AW_{ui} Water applied to indoor urban lands

AW_{uo} Water applied to outdoor urban lands

E Evaporation

T Transpiration

I_{fp} Infiltration of precipitation

I_{fAW} Infiltration of applied water

Q_{div} Surface water diversion

S_{ra} Agricultural runoff

S_{ru} Urban runoff

R_{fa} Agricultural return flow

R_{fu} Urban return flow

D_p Deep percolation of water to the unsaturated zone

$net D_p$ Recharge to the groundwater aquifer

Q_p Pumping from groundwater aquifer

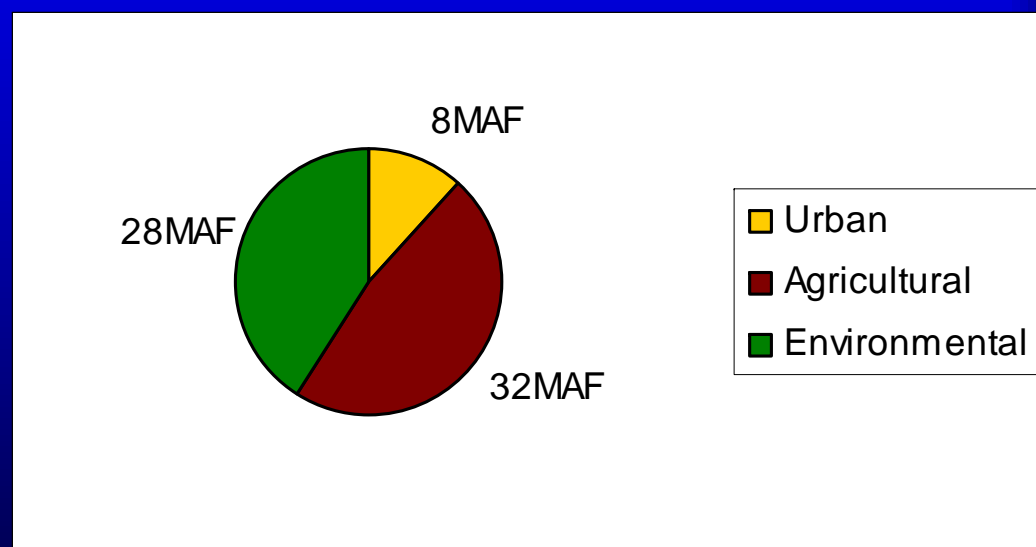
Q_r Recharge to groundwater aquifer

Q_s Stream-groundwater interaction

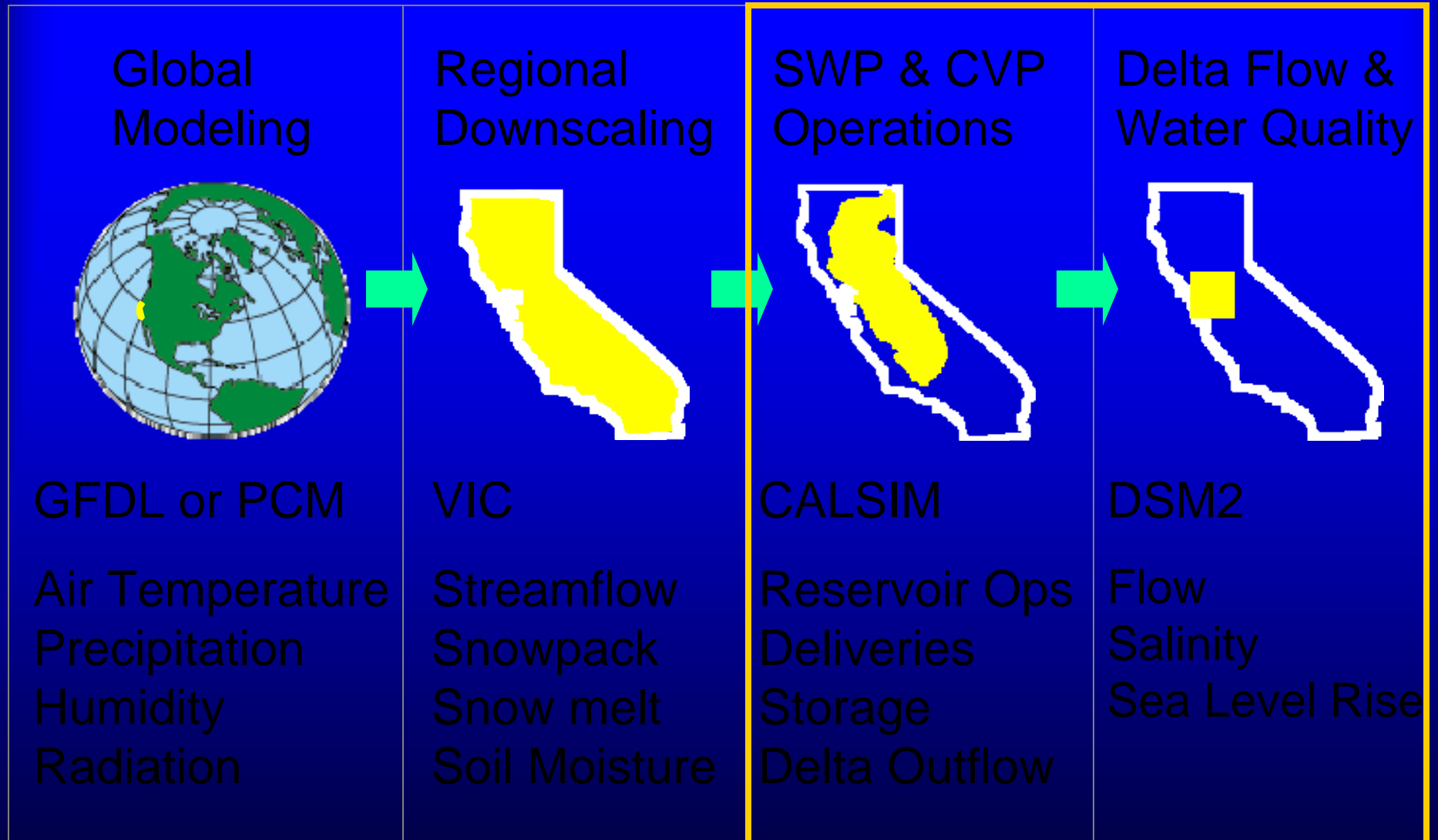
Q_L Lake-groundwater interaction

Importance of ET Estimates for Water Resources Planning

- ET is the largest consumptive use of DWR water (~80% in a normal water year), excluding water quality maintenance and environmental needs



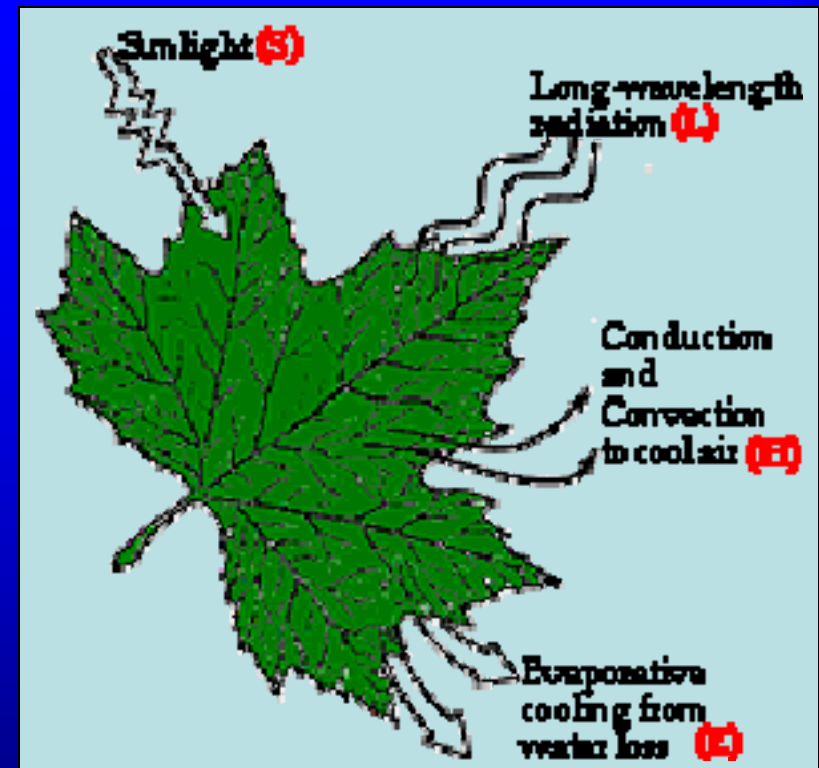
Analysis Process



Conducted by Work Team

How will climate change effect ET?

- Climate may change
 - Increase Air Temp.
 - Changed precipitation
- Plant water and energy demands may change
 - Plant energy balance
 - Plant adaptation
- What is overall effect on water needs for agriculture?

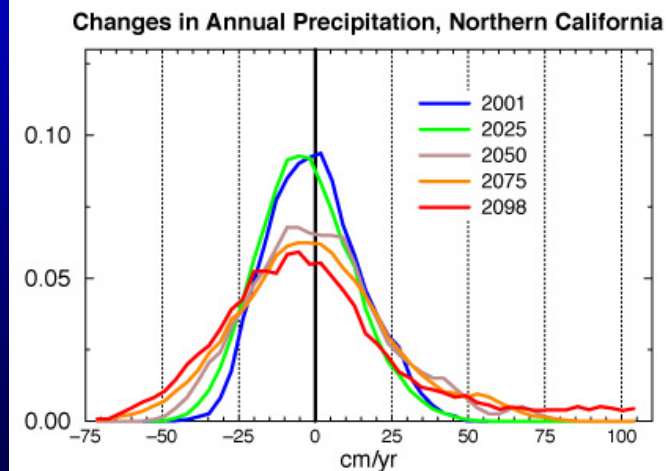
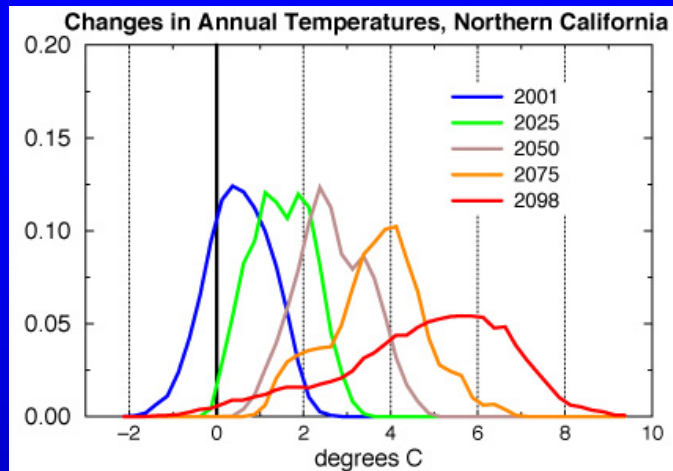


Importance of Economics



Working towards “Risk” cont.

Brainstorming methods for incorporating probability estimates into WR planning



Adapted from Dettinger, USGS/SCRIPPS, 2004

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